

ABSTRACT

An improved flow measurement device is provided in a flow path for direct measurement of flow. An internal heat source solves the problem of heat transfer in conventional mass flow meters. The heat transfer associated with the internal heater forms the basis of flow measurement, and improved accuracy is achieved. The flow measurement device advantageously eliminates the introduction of inaccuracies, bypass errors, or inaccurate assumptions that are inherent in a conventional bypass structure. The present measurement device eliminates the need for one or more bubblers and thus overcomes bubbler pressure sensitivity and the bubbler requirement for exact (and unstable) gas vapor saturation of conventional flow measurement. The flow measurement device works equally well with gases, liquids or mixtures of gases and liquids and provides greater control over flow rates with very high degree of precision.